

## CLAIMS

What is claimed is:

1. A process for producing a magnetic recording medium having at least one magnetic layer formed above a support, the process comprising:

a step of providing, on at least one side of the support, a smoothing coating layer having a thickness of 0.10 to 1  $\mu\text{m}$ , a surface roughness of at most 5 nm, a number of projections having a height of 20 nm or higher measured by atomic force microscopy (AFM) of at most 20 projections/900  $\mu\text{m}^2$ , and an amount of residual solvent of less than 10  $\text{mg}/\text{m}^2$ ; and

a step of forming at least one magnetic layer on or above the smoothing coating layer without winding up.

2. The process for producing a magnetic recording medium according to Claim 1, wherein the smoothing coating layer is formed by coating with a polymer solution and drying.

3. The process for producing a magnetic recording medium according to Claim 2, wherein in the polymer solution, a polymer compound having a number average molecular weight of 10,000 to 100,000 is used.

4. The process for producing a magnetic recording medium according to Claim 1, wherein the smoothing coating layer is formed by coating with a coating solution containing a compound having a radiation curing functional group in the molecule, and then irradiating with radiation so as to cure the compound.

5. The process for producing a magnetic recording medium according to Claim 4, wherein the compound having the radiation curing functional group is a di- or higher-functional acrylate compound having a molecular weight of 200 to 4,000.

6. The process for producing a magnetic recording medium according to Claim 1, wherein the smoothing coating layer is formed by coating with a coating solution containing a compound having a ultraviolet-curing functional group in the molecule, and then irradiating with ultraviolet rays so as to cure the compound.

7. The process for producing a magnetic recording medium according to Claim 1, wherein the smoothing coating layer has a thickness of 0.2 to 0.7  $\mu\text{m}$ .

8. The process for producing a magnetic recording medium according to Claim 1, wherein the smoothing coating layer has a surface roughness of 0.5 to 4.0 nm.

9. The process for producing a magnetic recording medium according to Claim 1, wherein the smoothing coating layer has an amount of residual solvent of at most 5  $\text{mg}/\text{m}^2$ .

10. The process for producing a magnetic recording medium according to Claim 1, wherein the smoothing coating layer has an amount thereof that dissolves in a methyl ethyl ketone/cyclohexanone mixed solution (1:1) of 0.0 to 0.4  $\text{mg}/\text{cm}^2$ .

11. The process for producing a magnetic recording medium according to Claim 1, wherein the support has a thickness of 3.0 to 6.5  $\mu\text{m}$ .

12. The process for producing a magnetic recording medium according to Claim 1, wherein the magnetic layer has a thickness of 20 to 500 nm.

13. The process for producing a magnetic recording medium according to Claim 1, wherein a non-magnetic layer containing a non-magnetic powder and a binder and having a thickness of 0.5 to 3.0  $\mu\text{m}$  is provided between the magnetic layer and the smoothing coating layer.

14. The process for producing a magnetic recording medium according to Claim 13, wherein the non-magnetic layer and the magnetic layer are provided by wet-on-wet coating.

15. The process for producing a magnetic recording medium according to Claim 1, wherein the process comprises a step of drying with drying air at 60°C or higher after the step of forming the magnetic layer.

16. The process for producing a magnetic recording medium according to Claim 1, wherein the magnetic layer employs a ferromagnetic metal powder.

17. The process for producing a magnetic recording medium according to Claim 1, wherein the magnetic layer employs a hexagonal ferrite powder.